

WHAT IS CLAIMED IS:

1. A binding apparatus in the form of a unit comprising:
a binding mechanism supported on a housing for binding a plurality of paper sheets by a staple needle; and
- 5 a moving mechanism supported on said housing for moving said binding mechanism;
wherein said housing comprises a pair of side plates and a pair of stays for connecting said side plates to each other, and said stays are constituted by said moving mechanism.
- 10 2. A binding apparatus as claimed in Claim 1, wherein said stays are partially constituted by a pair of thin plates having a substantially U-shaped cross-section.
- 15 3. A binding apparatus as claimed in Claim 2, wherein the back of said thin plate having a substantially U-shaped cross-section is aligned in the direction approximately perpendicular to the longitudinal direction of the side plate in one thin plate, and aligned in an approximately parallel direction in the other thin plate.
- 20 4. A binding apparatus as claimed in Claim 1, wherein said binding mechanism and a space section for passing the paper sheets are both interposed between said thin plates.
5. A binding apparatus as claimed in Claim 1, wherein said stays are partially constituted by a pair of shaft members having a substantially circular cross-section.
- 25 6. A binding apparatus as claimed in Claim 5, wherein said shaft members serve as a position controlling mechanism for limiting the position of the binding mechanism movably supported on said shaft members around the axis.

7. A binding apparatus as claimed in Claim 1, wherein said stays comprise only a pair of thin plates having a substantially U-shaped cross-section and a pair of shaft members having a substantially circular cross-section.

5 8. A binding apparatus comprising:

 a binding mechanism for binding a plurality of sheets between a stitcher section and a clincher section with a staple needle, said binding mechanism being equipped with said stitcher section including a staple needle storing section and a needle pushing out section and with a clincher section for bending one end of said needle in a separate manner;

10 supporting members for guiding said stitcher section and said clincher section to support said binding mechanism in a parallel manner; and

 moving mechanisms for moving said binding mechanism along said 15 supporting members;

 wherein a position controlling member for limiting the position of said supporting members and another controlling member for limiting the position of said binding mechanism around each of said supporting members as a center thereof are pair-wise disposed, and

20 wherein a channel for moving a binding needle pushed out from said stitcher section is disposed in the vicinity of a line connecting the centers of said supporting members, viewed in the axial direction of said supporting elements.

 9. A binding apparatus comprising:

25 a binding mechanism for binding a plurality of paper sheets between a stitcher section and a clincher section with a staple needle, said binding mechanism being equipped with said stitcher section including a staple

needle storing section and a needle pushing out section and with a clincher section for bending one end of said needle in a separate manner;

supporting members for guiding said stitcher section and said clincher section to support said binding mechanism in a parallel manner;

5 and

moving mechanisms for moving said binding mechanism along said supporting members;

wherein a position controlling member for limiting the position of said supporting members and another controlling member for limiting the 10 position of said binding mechanism around each of said supporting members as a center thereof are pair-wise disposed, and

wherein a channel for moving a binding needle pushed out from said stitcher section is disposed in a space between said supporting members, viewed in the axial direction of said supporting members.

15 10. A binding apparatus as claimed in Claim 8, wherein said channel for moving said binding needle is disposed on the line connecting the centers of said supporting members.

11. A binding apparatus as claimed in Claim 8 or 9, wherein said supporting members and said position controlling members are interposed 20 between said side plates to form a housing.

12. A binding apparatus as claimed in Claim 11, wherein said position controlling member is constituted by a thin plate having a substantially U-shaped cross-section.

13. A binding apparatus as claimed in Claim 12, wherein a portion 25 of the back of said position controlling member having a U-shaped cross-section is aligned in a direction approximately perpendicular to the longitudinal direction of the side plate for the one rotation controlling

member and in a direction approximately parallel to the longitudinal direction for the other stay.

14. A binding apparatus as claimed in Claim 13, wherein a harness connected to said binding mechanism is stored in said position controlling 5 member.

15. A binding apparatus as claimed in Claim 8, wherein said moving mechanism comprises a timing belt, a driving mechanism for driving said timing belt and a motor for supplying a driving force to said driving mechanism, and wherein said timing belt is disposed parallel to said 10 supporting members in the vicinity of a line connecting the centers of the supporting members, viewed in the axial direction thereof.

16. A binding apparatus as claimed in Claim 9, wherein said moving mechanism comprises a timing belt, a driving mechanism for driving said timing belt and a motor for supplying a driving force to said driving 15 mechanism, and wherein said timing belt is disposed parallel to said supporting members on an extending line of a space between the supporting members, viewed in the axial direction thereof.

17. A binding apparatus as claimed in Claim 15, wherein said moving mechanism comprises a sub-mechanism for moving the stitcher 20 section and a sub-mechanism for moving the clincher section, and wherein said sub-mechanisms are symmetrically disposed with respect to said supporting members.

18. A binding apparatus as claimed in Claim 15, wherein said driving mechanism includes a driving pulley and a driven pulley, and 25 wherein said driven pulley is disposed on said supporting members.

19. A binding apparatus as claimed in Claim 8, wherein a space for exchanging the needle is interposed between the supporting member for

supporting said stitcher section and the position controlling member on the side of said supporting members.

20. A binding apparatus as claimed in Claim 19, wherein said position controlling member is disposed approximately parallel to the 5 moving direction of the binding needle.

21. A paper processing apparatus comprising:

a binding apparatus; and

a paper processing mechanism for executing a predetermined process including the binding process to a paper sheet on which an image is formed,

10 wherein said binding apparatus including a binding mechanism for binding a plurality of paper sheets with a staple needle and a moving mechanism for moving said binding mechanism is supported on a housing to form a unit, and

15 wherein said housing comprises a pair of side plates and a pair of stays connecting said side plates, and said stays are constituted by said moving mechanism.

22. A paper processing apparatus comprising:

a binding apparatus; and

20 a paper processing mechanism for executing a predetermined process including the binding process to a paper sheet on which an image is formed,

wherein said binding apparatus, which is equipped with a stitcher section including a space for storing staple needles and a portion for pushing said staple needle as well as with a clincher section for bending one end of said staple needle, comprises a binding mechanism for binding a plurality of 25 paper sheets between said stitcher section and said clincher section with said staple needle; supporting members for supporting said binding mechanism and for guiding said stitcher section and said clincher section in a parallel

manner; and moving mechanism for moving said binding mechanism along said supporting elements,

wherein said supporting members and position controlling members for adjusting the position of said binding mechanism around said supporting members at the centers of said supporting members are pair-wise disposed, and

wherein a channel for receiving a binding needle pushed out from said stitcher section is disposed in the vicinity of a line connecting the centers of said supporting members, viewed in the axial direction of said supporting members.

23. A paper processing apparatus as claimed in Claim 22, wherein rollers for movement are mounted in the housing of said binding apparatus and rails for the roller are mounted in the main body of said paper processing apparatus, wherein said binding apparatus is mounted such that it can be drawn out by a predetermined distance with respect to said paper processing apparatus by moving said rollers on said rails, and wherein the backside of said stitcher is opened over the entire area of moving said binding mechanism, when said binding apparatus is drawn out.

24. An image forming system comprising:

20 a paper processing apparatus and an image forming apparatus for forming a visual image on a paper sheet based on the input image information,

wherein said paper processing apparatus is formed as a unit by supporting on a housing a binding apparatus; a paper processing mechanism for executing a predetermined process including the binding process after receiving a paper sheet on which an image is formed; a binding mechanism for binding a plurality of paper sheets with a staple needle; and a moving

mechanism for moving said binding mechanism, and

wherein said housing comprises a pair of side plates and a pair of stays for connecting said side plates, and said stays are formed by said moving mechanism.

5 25. A paper processing apparatus including a process mechanism for applying a predetermined process to a paper sheet after forming an image comprising:

 a stack mechanism for stacking paper sheets;

10 a first alignment mechanism for aligning a paper bundle stacked in said stack mechanism;

 a first convey mechanism for conveying a paper bundle aligned by said first alignment mechanism;

 a second alignment mechanism for aligning the paper bundle conveyed by said first convey mechanism in the vicinity of a folding position;

15 a second convey mechanism for conveying the paper bundle aligned by said second alignment mechanism to said folding position; and

 a folding mechanism for folding the paper bundle at said folding position.

26. A paper processing apparatus including a process mechanism for applying a predetermined process to a paper sheet after forming an image comprising:

 a stack mechanism for stacking paper sheets;

 a first alignment mechanism for aligning a paper bundle stacked in said stack mechanism;

25 a first convey mechanism for conveying a paper bundle aligned by said first alignment mechanism;

 a binding mechanism for applying the binding process to a paper

bundle;

a second alignment mechanism for aligning in the vicinity of a folding position the paper bundle which is bound by said binding mechanism and conveyed by said first convey mechanism;

5 a second convey mechanism for conveying the paper bundle aligned by said second alignment mechanism to said folding position; and

a folding mechanism for folding the paper bundle at said folding position.

27. A paper processing apparatus as claimed in Claim 26, wherein
10 said first alignment mechanism is equipped with a first paper bundle controlling mechanism for aligning the paper bundle stacked by said stack mechanism in the paper feed direction by touching the downstream end of the paper bundle thereto and an alignment member for aligning the paper bundle in the direction perpendicular to the paper feed direction by touching
15 the paper bundle in the direction perpendicular to the feed direction.

28. A paper processing apparatus as claimed in Claim 25, wherein
said second alignment mechanism is equipped with a second bundle control mechanism for aligning the paper bundle conveyed by said first convey mechanism in the vicinity of the folding position by touching the downstream
20 end of the paper bundle in the paper feed direction.

29. A paper processing apparatus as claimed in Claim 27, wherein
it is equipped with a first control releasing mechanism for releasing the control by said first paper bundle control mechanism.

30. A paper processing apparatus as claimed in Claim 28, wherein
25 it is equipped with a second control releasing mechanism for releasing the control by said second paper bundle control mechanism.

31. A paper processing apparatus as claimed in Claim 28, wherein

said second paper bundle control mechanism and said second convey mechanism are disposed downstream in the paper bundle feed direction with respect to said folding position.

32. A paper processing apparatus as claimed in Claim 25, wherein
5 the feed line includes a curved portion, which is disposed downstream in the paper bundle feed direction relative to said folding position.

33. A paper processing apparatus as claimed in Claim 25, further comprising: a first press contact force applying/releasing mechanism for applying a press contact force to a paper bundle regarding said first convey mechanism and for releasing the application of the press contact force; and a second press contact force applying/releasing mechanism for applying a press contact force to a paper bundle regarding said second convey mechanism and for releasing the application of the press contact force.

34. A paper processing apparatus as claimed in Claim 28, further
15 comprising: a second control releasing mechanism for releasing the control by said second paper bundle control mechanism; a second press contact force applying/releasing mechanism for applying a press contact to the paper bundle regarding said second convey mechanism and for releasing the application of the press contact force; and a control mechanism for
20 controlling said first and second convey mechanism, said second control releasing mechanism and said second press contact force applying/releasing mechanism; wherein when the downstream end of the paper bundle in the paper feed direction is adjusted by said second paper bundle control mechanism, said control mechanism applies a press contact force to the
25 paper bundle regarding said second convey mechanism by said second press contact applying/releasing mechanism, before releasing the control of said second paper bundle control mechanism by at least said second control

releasing mechanism.

35. A paper processing apparatus as claimed in Claim 34, wherein said control mechanism maintains the press contact force provided by said second convey mechanism when the paper bundle is folded by said folding mechanism.

36. An image forming system comprising: a paper processing apparatus including a process mechanism for applying a predetermined process to a paper sheet after image formation; and an image forming apparatus mounted either as a unit or in a separated unit on said paper processing apparatus; wherin said paper processing apparatus includes,

a stack mechanism for stacking the paper sheets;

a first alignment mechanism for aligning the paper bundle stacked by said stack mechanism;

a first convey mechanism for conveying the paper bundle aligned by said first alignment mechanism;

a second alignment mechanism for aligning the paper bundle conveyed by the first convey mechanism in the vicinity of the folding position;

a second convey mechanism for conveying the paper bundle aligned by said second alignment mechanism to said folding position; and

a folding mechanism for folding the paper bundle at said folding position.

37. A paper processing method for applying a predetermined process to the paper sheet on which the image formation is carried out, comprising the following steps of:

forming a paper bundle by stacking the paper sheets;

aligning said paper bundle thus stacked;

aligning said paper bundle in the vicinity of the folding position after
conveying said paper bundle thus aligned;

conveying said paper bundle thus aligned to said folding position;
and

5 folding said paper bundle at said folding position.